

CLAIMS

1. An interconnect for an electrically driven solid electrolyte oxygen separation device comprising a composition of matter represented by the general formula:



wherein

Ln is selected from the group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu;

A is selected from the group consisting of Sr, Ba and Y;

B is selected from the group consisting of Cu, Co, Cr, Fe, Ni, Zn, Nb, Zr, V, Ta, Ti, Al, Mg, and Ga;

$0.1 \leq x \leq 0.9$; $0.1 \leq x' \leq 0.9$; $0 \leq x'' \leq 0.5$;

$0.5 < y < 1.2$; and $0 \leq y' \leq 0.5$;

provided that $x + x' + x'' = 1$ and $1.2 > y + y' > 1.0$

wherein δ is a number which renders the composition of matter charge neutral.

2. The interconnect of claim 1 wherein Ln is La.

3. The interconnect of claim 1 wherein A is Sr.

4. The interconnect of claim 1 wherein B is Co.

5. The interconnect of claim 1 wherein $0.3 \leq x \leq 0.7$ and $0.3 \leq x' \leq 0.7$.

6. The interconnect of claim 1 wherein x'' is 0.

7. The interconnect of claim 1 wherein $0.9 < y < 1.2$ and $0 \leq y' \leq 0.1$.

8. The interconnect of claim 1 wherein y' is 0.

9. The interconnect of claim 1 wherein Ln is La, A is Sr, B is Co, $0.3 \leq x \leq 0.5$; $0.5 \leq x' \leq 0.7$; $0 \leq x'' \leq 0.2$; $0.9 < y < 1.05$; and $0 \leq y' \leq 0.1$; provided that $x + x' + x'' = 1$ and $1.05 > y + y' \geq 1.02$.

10. An interconnect for an electrically driven solid electrolyte oxygen separation device comprising a composition of matter represented by the general formula



wherein

Ln is selected from the group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu;

$0.1 \leq x \leq 0.9$; $0.1 \leq x' \leq 0.9$; and

10 $1.0 < y < 1.2$;

provided that $x + x' = 1$, and

wherein δ is a number which renders the composition of matter charge neutral.

11. The interconnect of claim 10 wherein $0.3 \leq x \leq 0.7$.

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12. The interconnect of claim 10 wherein Ln is La, $0.3 \leq x \leq 0.5$ and $1.0 < y < 1.05$.

13. An electrochemical solid-state device comprising at least two electrochemical cells which are electrically connected in series by one or more interconnects wherein at least one interconnect comprises a composition of matter represented by the formula

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wherein

Ln is selected from the group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu;

A is selected from the group consisting of Sr, Ba and Y;

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B is selected from the group consisting of Cu, Co, Cr, Fe, Ni, Zn, Nb, Zr, V, Ta, Ti, Al, Mg, and Ga;

$0.1 \leq x \leq 0.9$; $0.1 \leq x' \leq 0.9$; $0 \leq x'' \leq 0.5$;

$0.5 < y < 1.2$; and $0 \leq y' \leq 0.5$;

provided that $x + x' + x'' = 1$ and $1.2 > y + y' > 1.0$; and
wherein δ is a number which renders the composition of matter charge neutral.

14. The electrochemical solid-state device of claim 13 wherein Ln is La, A is Sr, B is Co, $0.3 \leq x \leq 0.5$; $0.5 \leq x' \leq 0.7$; $0 \leq x'' \leq 0.2$; $0.9 < y < 1.05$; and $0 \leq y' \leq 0.1$; provided that $x + x' + x'' = 1$ and $1.05 > y + y' \geq 1.02$.

15. An electrochemical solid-state device comprising at least two electrochemical cells which are electrically connected in series by one or more interconnects wherein at least one interconnect comprises a composition of matter represented by the formula:



wherein

Ln is selected from the group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu;

$0.1 \leq x \leq 0.9$; $0.1 \leq x' \leq 0.9$;

$1.0 < y < 1.2$

provided that $x + x' = 1$; and

wherein δ is a number which renders the composition of matter charge neutral.

16. The electrochemical solid-state device of Claim 15 wherein Ln is La, $0.3 \leq x \leq 0.5$ and $1.0 < y < 1.05$.